Paper No. 10

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAMES W. FULLER JR., and JEFFREY A. KNIGHT

Appeal No. 2000-2001
Application No. 09/172,732

ON BRIEF

Before FLEMING, RUGGIERO, and LALL, Administrative Patent Judges.
LALL, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1-21, all the pending claims in the application.

According to Appellants (brief at page 2), the present invention is concerned with improving the adhesion between a dielectric substrate and the heat sink or heat spreader attached to the substrate. More particularly, the present invention relates to an article that comprises a dielectric substrate and a heat spreader located adjacent the substrate. In order to

improve the adhesion between the dielectric substrate and the heat spreader, a layer of a codeposited ZnCr is provided intermediate the dielectric substrate and the heat spreader. In addition, the present invention is concerned with electronic packages that include an integrated circuit chip surrounded by a dielectric, a heat spreader located adjacent to the dielectric substrate and a layer of codeposited ZnCr intermediate the dielectric substrate and the heat spreader. The present invention is also concerned with the process for fabricating the above defined article. In particular, the process of the present invention involves providing a layer of a codeposited ZnCr on at least one major surface of a heat spreader, and then laminating the heat spreader to a dielectric substrate.

The following claim further illustrates the invention:

1. An article comprising a dielectric substrate; a heat spreader located adjacent said dielectric substrate; and a layer of ZnCr intermediate said dielectric substrate and said heat spreader for enhancing adhesion between said dielectric substrate and said metallic heat spreader.

The Examiner relies on the following references:

Miyamoto 4,876,588 Oct. 24, 1989

Applicants' admitted prior art

Claims 1-21 stand rejected under 35 U.S.C. § 103 as being unpatentable over Miyamoto in view of the admitted prior art.

Rather than repeat the arguments of Appellants and the Examiner, we make reference to the brief (paper no. 8) and the Examiner's answer (paper no. 9) for the respective details thereof.

OPINION

We have considered the rejections advanced by the Examiner and the supporting arguments. We have, likewise, reviewed the Appellants' arguments set forth in the brief.

We reverse.

REJECTION UNDER 35 U.S.C. § 103

As a general proposition, in an appeal involving a rejection under 35 U.S.C. § 103, an Examiner is under a burden to make out a prima facie case of obviousness. If that burden is met, the burden of going forward then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness, is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir.

1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976).

The Examiner provides a detailed explanation of the rejection of claims 1-21 at pages 4, 5, and 6 of the Examiner's answer, wherein the Examiner recognizes that Miyamoto does not teach said intermediate metal adhesive layer comprising ZnCr. The Examiner alleges that Appellants have admitted at page 6, lines 12-19 of their disclosure that the claimed heat spreader arrangement including the ZnCr layer were commercially available at the time of the invention. Therefore, the Examiner concludes (id. at page 5) that "[i]t would have been obvious ... to employ a layer of ZnCr in (sic) as it is shown by applicant in the device by Miyamoto in order to increase a durability of the device." Appellants argue (brief at pages 4 and 5) that "[t]o bridge this gap [i.e., the lack of ZnCr intermediate layer] in the prior art, the Office action relies upon the disclosure in the present application that refers to the commercial availability of an arrangement containing a ZnCr layer along with a layer of thereon of Cu/CuO .... However, the mere fact that such a combination exists in the prior art does not adequately suggest that such would be or should be used in the article or process of the present invention for enhancing adhesion between a

dielectric substrate and a heat spreader. Nothing in the prior art even remotely suggests that such would provide for the enhanced adhesion achieved by the present invention."

The Examiner responds (answer at page 7) that the adhesion is the main characteristic of ZnCr which is the "critical aspect of the present invention." We agree with the Examiner that having an enhanced adhesion between the heat spreader and the substrate is a critical part of the present invention and also that the ZnCr intermediate layer was commercially available at the time of the invention. However, we are persuaded by Appellants' arguments that the mere fact that ZnCr was commercially available does not make it obvious to make use of an intermediate layer of ZnCr for the recited application, which further results in the enhanced heat transfer.

Appellants further argue (brief at page 5) that the Examiner cites numerous references (U.S. Patent 5,343,073 to Parthasarathi, U.S. Patents 5,367,196 and 5,608,267 to Mahulikar, U.S. Patent 5,022,968 to Lin, U.S. Patent 5,302,158 to Chen, U.S. Patent 4,740,425 to Leland et al.) for apparently taking a "judicial notice" to show that the prior art does teach the application of an intermediate ZnCr layer between a heat spreader and a substrate. Appellants specifically argue (id.) that none

of these patents show the use of ZnCr layer as enhancing adhesion between a heat spreader and the substrate with a chip. The Examiner responds (Examiner's answer at page 7 and 8) that "[t]he fact that a layer of ZnCr enhances adhesiveness in an electronic components (sic) with different adhesives was inherent for one [of] ordinary skill [] ...." The Examiner further alleges (id. at 8) that the above-cited references which Appellants describe in relation to the "official notice" show that the adhesiveness for the "improvement of a tarnish resistance is not the end in itself but a mechanism of enhancing the adhesiveness in an (sic) electronic components with different adhesives." The Examiner admits (id. at 8) that none of these references relates to the adhering of a dielectric substrate to a heat sink or spreader, however, all of these references are "related to the ZnCr coating layer being used to enhance the adhesion between two different electronic and heat dissipating components and different adhesives which is exactly what the proposed invention is about." The Examiner concludes that he considers the cited references as sufficient evidence to prove that the recited enhanced adhesion was an inherent characteristic of
the particular type of commerically available heat spreader containing ZnCr.

The Federal Circuit has held "[t]o establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by person of ordinary skill.'" In re Robertson, Slip Op 98-1270 (Fed. Cir. February 25, 1999) citing Continental Can Co v. Monsanto Co., 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result for a given set of circumstances is not sufficient." Id. citing Continental Can Co v. Monsanto Co., 948 F.2d 1264, 1269, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991).

Following the guidelines of the Federal Circuit, we are not convinced that the Examiner has shown adequate extrinsic evidence by citing these references that inherency exists in the use of a ZnCr intermediate layer for use as a layer for enhancing adhesion between a heat spreader and the substrate. There may exist a good possibility or even a good probability that ZnCr having know adhesive characteristic may be used as one of the many ways or layers which will not only provide a good adhesion between the heat spreader and the substrate but also will provide a good heat transfer between the electronic components and the

heat spreader, however, the prior art has not suggested the recited application of ZnCr layer being used as an adhesive between the heat spreader and the substrate. Therefore, we are not convinced by the Examiner's arguments.

Since this recited feature appears in all the claims on appeal, we do not sustain the obviousness rejection of claims 1-21 over Miyamoto and the admitted prior art.

The decision of the Examiner under 35 U.S.C. § 103 is reversed.

REVERSED

MICHAEL R. FLEMING Administrative Patent Judge	)	
JOSEPH F. RUGGIERO Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
PARSHOTAM S. LALL Administrative Patent Judge	)	

PSL/jrg

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